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OBSERVATIONS ON THE RHIZOMES AND ROOTS OF *VACCINIUM MEMBRANACEUM*

by

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ABSTRACT

Rhizome occurrence and root structure of *Vaccinium membranaceum* were investigated by hydraulic excavation. Numerous, robust rhizomes were present. Taproots were not observed. *V. membranaceum* rhizomes sprouted vigorously after a light surface fire killed the shoots. They may be important in future huckleberry field management.

KEYWORDS: Huckleberry, *Vaccinium membranaceum*, root structure.

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Vaccinium membranaceum Dougl. (thin-leaved huckleberry), the most frequently harvested *Vaccinium* species in western North America, grows at moderate to high elevations in the mountains of British Columbia, Washington, Oregon, Montana, and Idaho--usually in old burns. Its deliciously flavored fruits are gathered by thousands of berrypickers every year.

Unfortunately, most berry-producing areas are now reverting from old burns to poor quality subalpine forest. The wild huckleberry resource is dwindling rapidly (Minore 1972). If this important resource is to be preserved, tree invasion should be curtailed and the fields managed for berry production. However, berry field management is hindered by lack of information about the physiology, ecology, and anatomy of western huckleberries. Rhizome and root information is particularly scarce.

Rhizome information has been recorded for several *Vaccinium* species. The rhizomes of *V. angustifolium* Ait., the eastern lowbush blueberry, apparently contribute to its ability to survive burning at 2- to 3-year intervals--a practice commonly used to prune the bushes and increase yields in the managed blueberry fields of eastern North America (Barker et al. 1964, Black 1963, Chandler and Mason 1939, Trevett 1956). Lowbush blueberry plants also have deep taproots that may supply water and soil nutrients not available in the shallower soil occupied by rhizomes (Hall 1957). *Vaccinium* taproots have not been reported elsewhere. However, *V. pallidum* Ait. (dryland blueberry) spreads to form colonies much like those of lowbush blueberry (Darrow et al. 1944), indicating an extensive rhizome system in this southeastern United States species. Smith (1962) described the rhizome structure and distribution of *V. myrtilloides* Mich. (velvet-leaf blueberry) and *V. vitis-idaea* L. (mountain cranberry) in western Alberta. *V. myrtillus* L. (dwarf bilberry) develops a vigorous rhizome system in the British Isles (Ritchie 1956). Chemists in Oregon collected the roots and rhizomes of *V. parvifolium* Smith (red huckleberry) and thin-leaved huckleberry and analysed them for triterpene content, but made no morphological observations (Sheth et al. 1968).

The observations reported here were undertaken to investigate rhizome occurrence and general root structure in the thin-leaved huckleberry. Root systems of three huckleberry plants growing in coarse sandy soil near Mount Adams, Washington, were hydraulically excavated in September 1973. A gasoline-powered portable pump was used to force water from a nearby lake through a 4-cm-diameter hose and fire nozzle. The resulting water jet, applied progressively to an entire root system as the excavation proceeded, washed away the soil without damaging roots or rhizomes. Exposed root systems were photographed. The smallest system was diagramed by drawing each rhizome and root segment in place after distances between forks and depths below the soil surface were measured and recorded. Root and rhizome portions were taken to the laboratory, where they were sectioned, stained with Safranin O and Fast Green, and examined microscopically. Additional portions were examined after two more *V. membranaceum* plants were shovel-excavated near Mount Hood and on the Dead Indian Plateau east of Ashland, Oregon, in July 1975.

Numerous, robust rhizomes were present in every plant excavated. Ranging in diameter from 1 to 3 cm, most occurred 8-30 cm below the soil surface. Rootlike in external appearance (fig. 1), these rhizomes had numerous dormant vegetative buds. They revealed large central piths when viewed in cross section (fig. 2). Piths were not visible in cross sections of the roots (fig. 3). The smallest, simplest root system excavated is diagramed in figure 4. The largest

Figure 1.--Thin-leaved huckleberry rhizomes and roots viewed from above. The smaller, branching structures are roots. Small rhizomes are best differentiated from large roots by examining cross sections for presence or absence of pith.

Figure 2.--Cross section of thin-leaved huckleberry rhizome. Note large pith and dormant bud. The bar is 5 mm long.

Figure 3.--Cross section of thin-leaved huckleberry root. Note the absence of pith. The bar is 5 mm long.

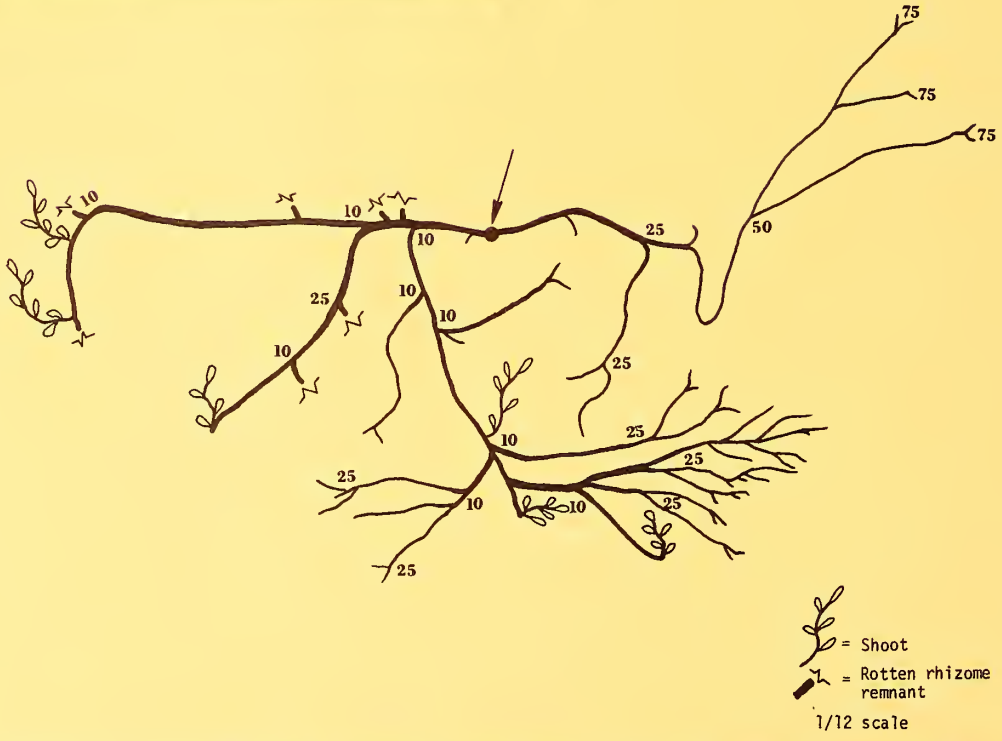

Figure 4.--Diagram of a simple rhizome and root system of thin-leaved huckleberry as viewed from above. Approximate depths (cm) are indicated. The arrow indicates probable origin of plant. Roots less than 5 mm in diameter are not shown.

root system occupied an area of 8 m^2. Supporting 47 shoots, it was a complex, multilayered maze that included hundreds of rhizome and root branches.

No taproots were observed in the excavated plants. However, occasional sinker roots were found descending to depths of 70-100 cm. Rhizome branching usually was dichotomous, but occasional burllike forks were encountered where three or more branches diverged at random angles from a common origin. Proximal and distal portions of the rhizome system usually were identifiable by fork orientation--where dichotomous branching occurred, the laterals diverged at angles of less than 90°.

Neither rhizomes nor shoots were weighed, but rhizome and root biomass appeared to be much greater than that of the shoots. Most of the observed rhizomes were deep enough to avoid damage from light surface fires. Indeed, similar rhizomes sprouted prolifically after a 1972 fire. If the resulting shoots bear fruit in a reasonable period of time, it may be possible to enhance huckleberry vigor and control competing vegetation in thin-leaved huckleberry fields by burning them repeatedly.

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